Factors and Impact of Access to Primary Health Care Services on Tuberculosis Awareness among Women in Rural Communities in Orlu, Imo State

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ABSTRACT

Background: Equitable access to healthcare is a core principle of national health systems globally. However, individuals living in rural communities continue to face substantial informational, geographical, and financial barriers to primary health care (PHC) services. These barriers contribute to poorer health outcomes and widen rural–urban health disparities.

Aim: This study assessed factors associated with access to PHC services and examined the influence of PHC access on tuberculosis (TB) awareness among adult women residing in rural communities in Orlu, Imo State.

Methods: A community-based descriptive cross-sectional study was conducted using a convenience sampling approach to select the study area based on proximity, security, and accessibility. A simple random sampling technique was then used to recruit 430 women. Data were collected using a semi-structured questionnaire administered through self-report and interviewer assistance, encoded using Open Data Kit (ODK), and analysed with SPSS version 28. Descriptive statistics (frequencies and percentages) and chi-square tests were used, with significance set at $p < 0.05$.

Results: Most respondents (60%) demonstrated poor knowledge or awareness of pulmonary TB. More than half (51%) reported poor to moderate health status, and 47% had poor access to PHC services. TB awareness/knowledge was significantly associated with educational level ($p = 0.002$), occupation ($p = 0.020$), and household room density ($p = 0.002$). However, TB awareness was not significantly associated with access to PHC services ($p = 0.119$).

Conclusion: Despite limited TB awareness and restricted access to PHC services, women in these rural communities reported generally good perceived health status, suggesting notable resilience. The findings highlight the need for holistic, strengthened PHC systems that ensure equitable, accessible, and high-quality care for rural women, alongside targeted interventions to improve TB knowledge.

Keywords: Tuberculosis, Awareness, Knowledge, Primary Health Care Access, Rural Communities.

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INTRODUCTION

Primary health care (PHC) represents the foundation of effective health systems globally and remains central to achieving equitable and accessible health services. Defined at the International Conference on Primary Health Care, PHC encompasses essential health services delivered through scientifically sound, socially acceptable, and affordable methods that communities can readily access and sustain through active participation.[1] Despite this universal mandate, access to PHC remains uneven, particularly between urban and rural populations. Evidence consistently shows that rural residents face more pronounced informational, geographic, and financial barriers than their urban counterparts, which contributes to poorer health outcomes and entrenched health disparities.[3–5] PHC services operate at both individual and population levels, delivering preventive, promotive, and curative interventions such as health education, environmental health, nutrition, family planning, immunization, disease control, treatment of minor ailments, and provision of essential drugs.[6–9] Tuberculosis (TB) remains a major global health threat and is strongly intertwined with social and economic inequities. It disproportionately affects impoverished populations—particularly rural dwellers who often face food insecurity, substandard housing, and limited health care access.[10] TB morbidity and mortality, especially in low- and middle-income countries, are concentrated among men and individuals of working age.[11] The World Health Organization's End TB Strategy emphasizes universal health coverage (UHC) as one of the most effective pathways to reducing TB burden by 2025.[12] The Declaration of Astana further reinforces PHC as the cornerstone of UHC, highlighting its potential to reduce TB incidence and mortality among vulnerable populations in resource-limited settings.[13] Strengthening community-based PHC therefore holds significant promise for mitigating TB burden in rural communities. Access to health services is often assessed through health service coverage (HSC), which reflects the capacity of facilities to meet the needs of their target populations. Availability, accessibility, accommodation, affordability, and acceptability constitute key dimensions of access, yet the presence of a facility alone does not guarantee optimal utilization.[14–16] Geographic accessibility—specifically proximity to health facilities—significantly shapes patterns of PHC utilization.[18] Spatial analysis using residential locations and geographic information systems (GIS) provides valuable insights into inequities in service availability and helps guide resource allocation and facility placement.[16–24] In Nigeria, healthcare delivery is organized across primary, secondary, and tertiary levels, with PHC facilities serving as the first point of contact for most citizens.[25] Although Nigeria has implemented the Directly Observed Treatment Short-Course (DOTS) strategy for nearly three decades and continues to expand PHC infrastructure, significant challenges remain, particularly regarding TB control. Long distances to treatment facilities and inconsistent drug availability have been shown to undermine treatment adherence, reduce treatment success, and increase the likelihood of loss to follow-up.[26–27] TB exerts a disproportionate burden on the poorest populations, and equitable health requires that all individuals, regardless of socioeconomic status, can access quality services tailored to their needs.[28–32] Achieving equity demands a combination of broad public health interventions and targeted efforts aimed at vulnerable populations.[33] Understanding the lived experiences of rural residents is therefore crucial to identifying barriers to TB services and improving both quality and uptake of care. Poverty compounds these barriers, limiting health-seeking behavior, diminishing ability to adhere to long and complex treatment regimens, and reducing understanding of clinical instructions. Cultural beliefs further influence health decisions, sometimes conflicting with biomedical knowledge and affecting treatment outcomes.[34–35] The global agenda to eradicate TB by 2030, articulated under Sustainable Development Goal 3.3, therefore requires prioritizing infection control and early diagnosis at PHC facilities.[36] Poor implementation of TB infection control—including delays in identifying symptomatic individuals, inadequate patient flow, and facility overcrowding—continues to drive TB transmission in healthcare settings.[37–39] Because nurses are key implementers of infection control at the PHC level, their practices, competencies, and work environments are critical determinants of TB outcomes; however, studies indicate persistent gaps in infection control practices across PHC facilities.[40–42] Despite Nigeria's commitment to PHC strengthening, significant underutilization persists, including within TB services. Recent studies document challenges such as overcrowding, long waiting times, inadequate infrastructure, insufficient funding, and unreliable power supply—all of which undermine the functionality of PHC facilities and limit access to essential services such as immunization and antenatal care.[33–34,46] These systemic weaknesses contribute to gaps in TB case detection and management, particularly in rural settings. Nigeria's high TB/HIV co-infection burden and the large proportion of undetected TB cases underscore the urgency of addressing these challenges.[44–45] The compounded effects of poverty, inadequate healthcare delivery, infrastructural deficits, and socio-cultural influences make it essential to investigate how rural women perceive and access PHC services and how these factors shape their awareness of TB. Given this context, the present study focuses on women in

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rural communities in Orlu, Imo State, examining the interplay between PHC access, socio-demographic characteristics, health status, and TB awareness. Because women frequently serve as caregivers and primary decision-makers in family health matters, understanding their experiences provides critical insights for improving community TB control. This work aims to generate evidence that will support local governments and health service providers in designing targeted interventions, strengthening PHC delivery, enhancing TB awareness, and ultimately improving health outcomes in rural Nigeria.

LITERATURE REVIEW

Literature consistently demonstrates that access to primary health care (PHC) remains deeply unequal in rural settings, largely due to geographic isolation, poor transportation networks, limited facility distribution, workforce shortages, and financial constraints.[47–50] These structural barriers reduce service availability and utilization, leading to unmet health needs and widening disparities between rural and urban populations. Studies from diverse settings—including China, Australia, Ghana, Nigeria, and South Africa—show that rural women face unique challenges such as long travel distances, low household income, limited health literacy, and cultural influences that hinder their ability to seek care, comply with treatment, or access TB-related services.[51–61] Evidence on tuberculosis (TB) awareness reveals significant knowledge gaps globally, particularly in rural and low-income settings where myths, stigma, and misconceptions persist.[62–75] Awareness of TB symptoms, routes of transmission, and availability of free treatment is often low, causing delays in diagnosis, increased community transmission, and reduced treatment adherence. Studies across Africa and Asia consistently report that TB knowledge is strongly associated with education level, exposure to health workers, media messaging, cultural beliefs, and household socioeconomic status.[65–73,75] Research assessing health status among TB patients shows that TB substantially impairs quality of life and is associated with both physical and psychological burdens.[76–83] Even after treatment, many patients continue to experience long-term sequelae, reduced well-being, and persistent social stigma. Quality-of-life studies demonstrate worse health outcomes among individuals with active TB, HIV–TB co-infection, multidrug-resistant TB (MDR-TB), and extra-pulmonary disease.[84–104] Consequently, impaired health status influences health-seeking behaviour and reinforces barriers to PHC utilization. Factors influencing PHC access are multidimensional, including predisposing characteristics (age, gender, education, cultural beliefs), enabling factors (income, insurance, facility location, transportation), and need factors (perceived illness severity, chronic conditions).[106–175] Socioeconomic disparities, poor facility quality, drug stock-outs, long waiting times, and negative attitudes of health workers consistently deter rural populations from using PHC services. Financial barriers, hidden costs, and user fees—despite policies promoting free PHC—further limit access.[216–231] Improved access to PHC is strongly associated with higher TB awareness. Studies show that communities with closer, better-equipped facilities or stronger PHC coverage report better knowledge of TB symptoms, prevention, and treatment.[187–192] PHC systems also play a central role in raising awareness through health education, counseling, routine consultations, and community outreach.[193–200] Educational interventions delivered through PHC significantly improve TB knowledge and positively influence health behaviour. Government initiatives and TB control policies influence health service accessibility and awareness levels. Weak governance, inadequate funding, limited integration of TB services, and inconsistent policy implementation remain major barriers in many low- and middle-income countries, including Nigeria.[201–202] Strengthening governance, ensuring uninterrupted drug supply, improving accountability, and integrating TB into PHC frameworks are crucial to improving awareness and early detection. Community engagement and empowerment are also essential components of PHC delivery. Active community participation enhances health promotion, improves uptake of TB services, reduces stigma, and supports sustainable health interventions.[199–200] When communities are mobilized and empowered, TB awareness improves, and preventive behaviours become more widely adopted. Overall, the literature highlights a clear relationship between improved PHC access and higher tuberculosis awareness. Addressing structural, socioeconomic, and cultural barriers—alongside strengthening governance and promoting community participation—is essential to improving TB awareness and overall health outcomes in rural settings.

METHODS

The study was conducted in four rural communities in Orlu—Umuna, Owerre Ebeiri, Eziachi, and Umuokwara—an agrarian region in Imo State, Nigeria, characterized by warm climatic conditions, seasonal rainfall, erosion-prone topography, and limited social amenities. The population is predominantly engaged in

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farming and palm oil production, with health services delivered primarily through local primary health care (PHC) facilities.[189,190] Against this backdrop, a community-based descriptive cross-sectional design was employed to assess factors influencing access to PHC services and their impact on tuberculosis (TB) awareness among women. The study population comprised adult women aged 20 years and above who were permanent residents of the selected communities. Eligibility required informed consent, while women with severe illness, mental incapacity, those who withdrew consent, or were absent during data collection were excluded. Using Cochrane's sample size formula and assuming a 50% prevalence estimate, a minimum sample of 384 was calculated, which was increased to 430 to account for non-response.[191] A convenience sampling technique was used to select both study sites and participants, primarily due to security concerns, accessibility issues, and practical considerations; women were recruited in public spaces, workplaces, and residential areas without predetermined selection patterns. Data collection utilized a semi-structured questionnaire adapted from prior studies and modified for contextual relevance.[192] The tool contained 36 items covering socio-demographic characteristics, TB awareness and knowledge, health status, and access to PHC services. Data were collected using the Open Data Kit (ODK), with instruments uploaded onto Kobo Toolbox and administered through self-response and interviewer assistance. For participants with limited English proficiency, explanations were provided in Igbo to ensure comprehension and accurate responses. Completed questionnaires were uploaded electronically following informed consent procedures. Data management involved exporting responses from Kobo Toolbox to Microsoft Excel for cleaning and subsequently analyzing the dataset using SPSS version 28.[193] Descriptive statistics, including frequencies and percentages, summarized respondent characteristics and key variables. Analytical procedures included chi-square tests and cross-tabulations to examine associations, with statistical significance set at $p < 0.05$. Scoring systems were developed for key constructs. TB awareness was quantified on a 31-point scale and categorized as poor (0–15), moderate (16–21), or good (22–31). Health status was assessed using four items with scores classified as poor (0–1), moderate (2), or good (3–4). Access to PHC services was rated on a 9-point scale and categorized as poor (0–4), moderate (5–6), or good (7–9). These structured scoring frameworks facilitated consistent interpretation of participants' knowledge, experiences, and health-seeking behaviours. Written informed consent was secured from each participant, with provisions for reading the text aloud to non-literate respondents and using thumbprints as signatures. Confidentiality, voluntary participation, and the right to withdraw at any point were emphasized. [194]

RESULTS

Table I: Socio-demographic Characteristics of Women in Rural Communities in Orlu

Variables	Frequency (N=430)	Percentage
Age (years)		
Young Adult Women	212	49.3
Middle Aged Women	123	28.6
Older Adult Women	95	22.1
Total	430	100.0
Marital status		
Divorced/Separated/Widowed	14	3.3
Married	300	69.8
Single	116	27.0
Total	430	100.0
Family/marriage type		
Monogamy	296	68.8
No husband/partner	118	27.4
Polygamy	16	3.7
Total	430	100.0
Religion		
Anglican	50	11.6
Catholic	241	56.0
Muslim	2	.5
Others	8	1.9

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Pentecostal	115	26.7
Traditional	14	3.3
Total	430	100.0
Highest educational level		
Primary	58	13.5
Secondary	281	65.3
Tertiary	91	21.2
Total	430	100.0

Table I (cont'd): Socio-demographic Characteristics of Women in Rural Communities in Orlu

Variables	**Frequency (N=430)**	**Percentage**
Occupation		
Civil servant	24	5.6
Farmer	2	0.5
None	3	0.7
Others	26	6
Students	21	4.9
Trading/Business	354	82.3
Total	430	100
Monthly Income		
Above ₦50,000	71	16.5
Less ₦10,000	88	20.5
₦10,000 -20,000	155	36
₦21,000-50,000	116	27
Total	430	100
Type of residence		
Communal	71	16.5
Owned	171	39.8
Rented	188	43.7
Total	430	100
Number of rooms		
1-3 rooms	242	56.3
4-6 rooms	151	35.1
More than 6 rooms	37	8.6
Total	430	100
Number of persons		
0-2 persons	73	17
3-5 persons	180	41.9
More than 5 persons	177	41.2
Total	430	100
Number of children		
0-2 children	218	50.7
3-5 children	171	39.8
More than 5 children	41	9.5
Total	430	100

Table I presents the socio-demographic characteristics of the respondents. Almost half (49.3%) were young adult women, and most were married, with 68.9% in monogamous unions. The respondents were predominantly Christian, with more than half identifying as Catholic (56.0%). Educational attainment was relatively high, as approximately two-thirds (65.3%) had completed secondary school. A large proportion (82.3%) were engaged in trading or business activities as their main occupation. More than one-third (36.0%) reported a monthly income between ₦10,000 and ₦20,000. In terms of housing conditions, 43.7% lived in rented apartments, and

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56.3% resided in households comprising 1–3 rooms. These households typically accommodated 3–5 persons (41.9%), and more than half (50.7%) had between 0 and 2 children.

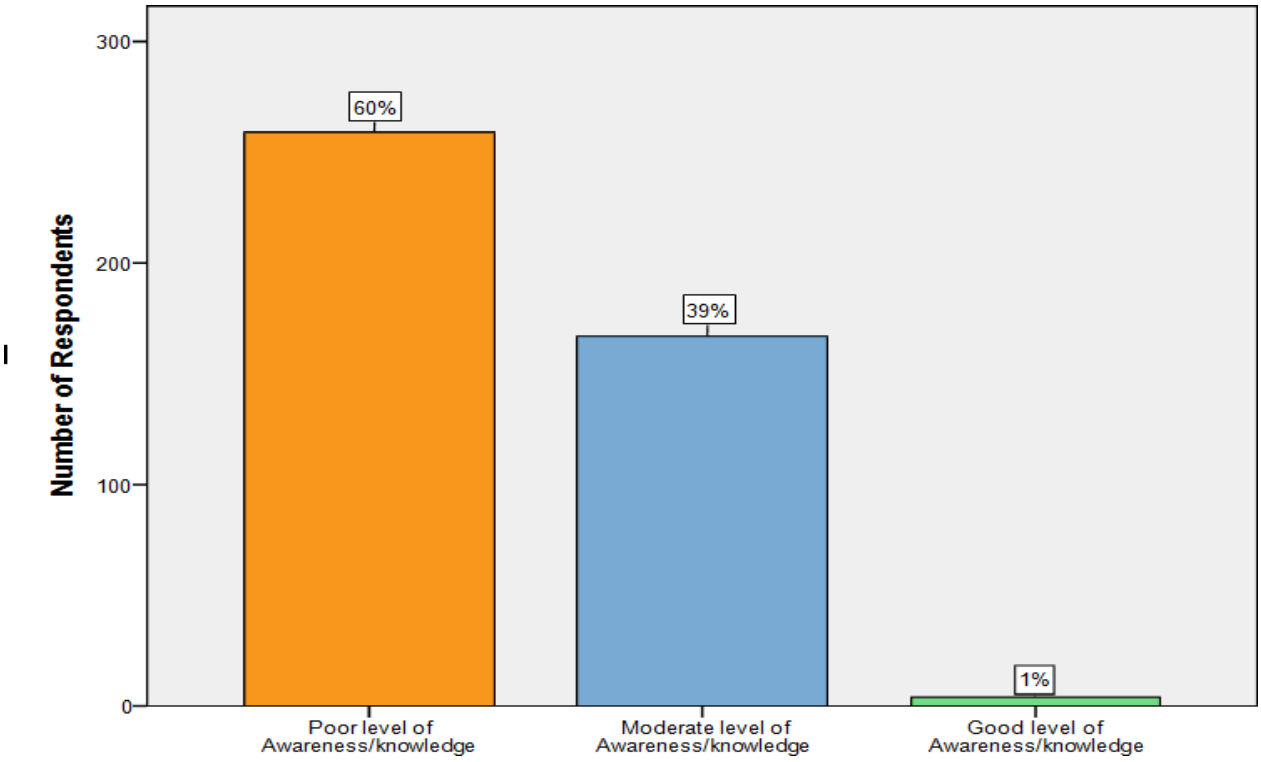

Figure I: Level of Awareness and Knowledge of Pulmonary TB among Women in Rural Communities in Orlu.

Figure I show that the majority of respondents (60%) demonstrated a poor level of knowledge and awareness regarding pulmonary tuberculosis.

Table II: Health Status of Women in Rural Communities in Orlu

Variables	**Frequency (N=430)**	**Percentage**
Have you or any family member suffered from tuberculosis?		
Yes	60	14.0
No	370	86.0
Total	430	100.0
What is your HIV Status?		
Positive/Unknown	176	40.9
Negative	254	59.1
Total	430	100.0
Do you or any family member within your household have any chronic health condition?		
Yes/Not sure	292	67.9
No	138	32.1
Total	430	100.0
Have you ever received BCG?		
No / I don't know	138	32.1
Yes	292	67.9
Total	430	100.0

Table II shows that most respondents or their family members (86.0%) had never been diagnosed with pulmonary tuberculosis (PTB). More than half (59.1%) of the respondents reported being HIV-negative. Additionally, approximately two-thirds (67.9%) indicated that they or their family members had chronic health conditions and had received the BCG vaccine.

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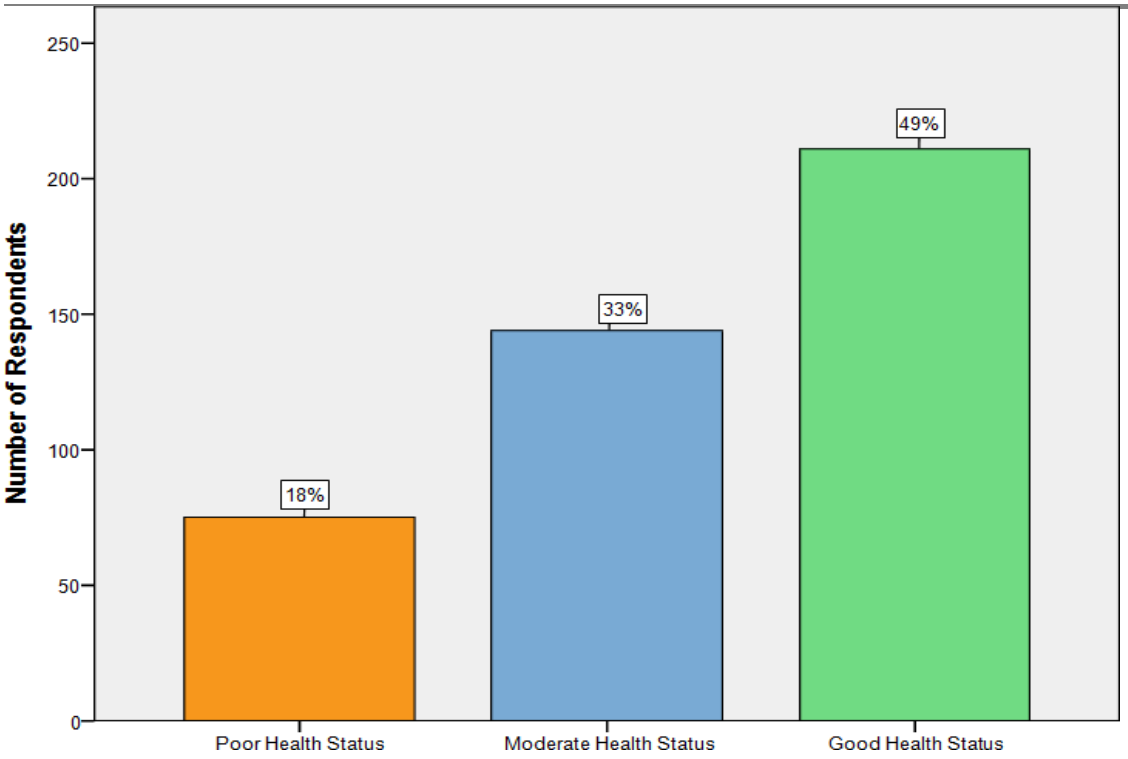

Figure II Health Status Levels of Women in Rural Communities in Orlu

Figure II shows that more than half of the respondents (51%) had poor to moderate health status.

Table III: Association between Health Status and Awareness of PTB among Women in Rural Communities in Orlu

Variable	**Level of Awareness/knowledge of PTB**				**Total % N=430**
Health Status Level	**Poor level of awareness/knowledge**	**Moderate-Good level of awareness/knowledge**	**Total (%)**	**df**	**χ^2/p-value**
Poor Health Status	57(76.0)	18(24.0)	75(100.0)	2	**13.435/0.001***
Moderate Health Status	91(63.2)	53(36.8)	144(100.0)		
Good Health Status	111(52.6)	100(47.4)	211(100.0)		
Total	259(60.2)	171(39.8)	430(100.0)		

*significant

Table III shows a significant association between respondents' level of awareness/knowledge of pulmonary tuberculosis (PTB) and their health status ($p < 0.001$).

Table IV: Association between Socio-demographic Factors and Awareness of PTB among Women in Rural Communities in Orlu

	Level of Awareness/knowledge of PTB				**Total % N=430**
Socio-demographic Factors	**Poor level of awareness/knowledge**	**Moderate-Good level of awareness/knowledge**	**Total (%)**	**df**	**χ^2/p-value**
Age group					
Young Adult Women	128(60.4)	84(39.6)	212(100.0)	2	0.096/0.953
Middle Aged Women	75(61.0)	48(39.0)	123(100.0)		
Older Adult Women	56(58.9)	39(41.1)	95(100.0)		
Total	259(60.2)	171(39.8)	430(100.0)		

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Marital status					
Married	168(56.0)	132(44.0)	300(100.0)	1	7.422/0.006
Single	91(70.0)	39(30.0)	130(100.0)		
Total	259(60.2)	171(39.8)	430(100.0)		
Family/marriage type					
Monogamy	163(55.1)	133(44.9)	296(100.0)	2	10.664/0.005
No husband/partner	84(71.2)	34(28.8)	118(100.0)		
Polygamy	12(75.0)	4(25.0)	16(100.0)		
Total	259(60.2)	171(39.8)	430(100.0)		
Regrouped Religion					
Anglican	30(60.0)	20(40.0)	50(100.0)	3	5.253/0.154
Catholic	137(56.8)	104(43.2)	241(100.0)		
Others	19(79.2)	5(20.8)	24(100.0)		
Pentecostal	73(63.5)	42(36.5)	115(100.0)		
Total	259(60.2)	171(39.8)	430(100.0)		

*significant

Table IV (cont'd): Relationship between Socio-demographic Factors and Awareness of PTB among Women in Rural Communities in Orlu

Variable	**Level of Awareness/knowledge of PTB**				**Total % N=430**
Socio-demographic Factors	**Poor level of awareness/knowledge**	**Moderate-Good level of awareness/knowledge**	**Total (%)**	**df**	**χ^2/p-value**
Educational level					
Primary	39(67.2)	19(32.8)	58(100.0)	2	**12.970/0.002***
Secondary	180(64.1)	101(35.9)	281(100.0)		
Tertiary	40(44.0)	51(56.0)	91(100.0)		
Total	259(60.2)	171(39.8)	430(100.0)		
Occupation					
Civil servant	8(33.3)	16(66.7)	24(100.0)	3	**9.852/0.020***
Others	16(51.6)	15(48.4)	31(100.0)		
Students	15(71.4)	6(28.6)	21(100.0)		
Trading/Business	220(62.1)	134(37.9)	354(100.0)		
Total	259(60.2)	171(39.8)	430(100.0)		
Monthly Income					
Above 50,000	37(52.1)	34(47.9)	71(100.0)	3	6.096/1.107
Less N10,000	60(68.2)	28(31.8)	88(100.0)		
N10,000 -20,000	98(63.2)	57(36.8)	155(100.0)		
N21,000-50,000	64(55.2)	52(44.8)	116(100.0)		
Total	259(60.2)	171(39.8)	430(100.0)		

*significant

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Table IV (cont'd): Association between Socio-demographic Factors and Awareness of PTB among Women in Rural Communities in Orlu

Variable	**Level of Awareness/knowledge of PTB**				**Total % N=430**
Socio-demographic Factors	**Poor level of awareness/knowledge**	**Moderate-Good level of awareness/knowledge**	**Total (%)**	**df**	**χ^2/p-value**
Highest educational level					
Type of residence					
Communal	51(71.8)	20(28.2)	71(100.0)	2	5.175/0.075
Owned	102(59.6)	69(40.4)	171(100.0)		
Rented	106(56.4)	82(43.6)	188(100.0)		
Total	259(60.2)	171(39.8)	430(100.0)		
Number of rooms grouping					
1-3 rooms	130(53.7)	112(46.3)	242(100.0)	2	**12.792/0.002***
4-6 rooms	99(65.6)	52(34.4)	151(100.0)		
More than 6 rooms	30(81.1)	7(18.9)	37(100.0)		
Total	259(60.2)	171(39.8)	430(100.0)		
Number of persons grouping					
0-2 persons	52(71.2)	21(28.8)	73(100.0)	2	4.448/0.108
3-5 persons	104(57.8)	76(42.2)	180(100.0)		
More than 5 persons	103(58.2)	74(41.8)	177(100.0)		
Total	259(60.2)	171(39.8)	430(100.0)		
Number of children grouping					
0-2 children	139(63.8)	79(36.2)	218(100.0)	2	2.704/0.259
3-5 children	95(55.6)	76(44.4)	171(100.0)		
More than 5 children	25(61.0)	16(39.0)	41(100.0)		
Total	259(60.2)	171(39.8)	430(100.0)		

Table IV demonstrates that respondents' level of awareness and knowledge of pulmonary tuberculosis (PTB) was significantly associated with their educational level (p = 0.002), occupation (p = 0.020), and the number of rooms in their household (p = 0.002).

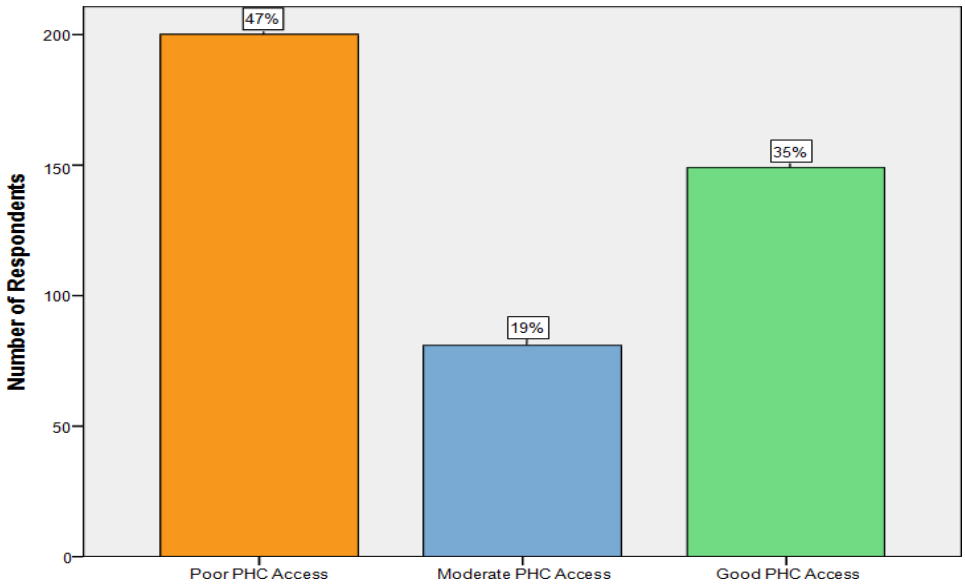

Figure III Level of Access to PHC services among Women in Rural Communities in Orlu

Figure III shows that close to half of the respondents (47%) had poor access to primary health care (PHC).

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Table V: Association between PHC Access and Awareness of PTB among Women in Rural Communities in Orlu

Variable	**Level of Awareness/knowledge of PTB**				**Total % N=430**
Level of PHC Access	**Poor level of awareness/knowledge**	**Moderate-Good level of awareness/knowledge**	**Total (%)**	**df**	**χ^2/p-value**
Poor PHC Access	129(64.5)	71(35.5)	200(100.0)	2	4.258/0.119
Moderate PHC Access	50(61.7)	31(38.3)	81(100.0)		
Good PHC Access	80(53.7)	69(46.3)	149(100.0)		
Total	259(60.2)	171(39.8)	430(100.0)		

Table V shows that respondents' level of awareness and knowledge of pulmonary tuberculosis (PTB) was not significantly associated with their level of access to primary health care (PHC) services (p = 0.119).

DISCUSSION

This study examined factors influencing access to primary health care (PHC) services and their impact on tuberculosis (TB) awareness among adult women residing in rural communities in Orlu. The findings revealed a consistently poor level of awareness and knowledge of pulmonary TB, coupled with limited access to PHC services, despite the generally good self-reported health status of respondents. The inadequate awareness observed aligns with earlier studies in Nigeria, which also documented low levels of TB knowledge among rural populations.[195–197] The proportion of women with poor TB knowledge in this study exceeded the national estimate of 59.7%,198 suggesting that substantial information gaps persist within these communities. These deficiencies in knowledge may be attributed to several socio-demographic determinants, including poverty, limited formal education, and entrenched cultural beliefs, all of which shape health-seeking behaviour and perceptions of disease.[199,200] Although the region has experienced significant disruptions due to separatist group activity and associated security issues, respondents surprisingly reported relatively good health status. This finding contrasts with studies from other conflict-affected regions where instability is typically associated with worsened health outcomes and reduced access to essential services.[201,202] The persistence of good health perceptions among women in Orlu may reflect strong community resilience, reliance on traditional healing practices, and adaptive coping strategies, particularly during periods when health facilities become inaccessible due to sit-at-home orders. Such movement restrictions disproportionately affect vulnerable groups, including older adults and those living with chronic illnesses, often forcing them to seek non-formal alternatives to modern healthcare.[201] The study further demonstrated that education significantly influences TB awareness and knowledge, consistent with evidence showing that health literacy plays a fundamental role in disease understanding and behavioural responses.[203–204] However, increased knowledge did not translate into improved access to PHC services among respondents. This disparity highlights the systemic and structural barriers—such as infrastructural inadequacy, health worker shortages, negative provider attitudes, transportation challenges, and persistent insecurity—that hinder equitable access to PHC services, even when awareness is adequate.[203,204] While education fosters critical thinking, informed decision-making, and health-seeking intentions, it cannot compensate for weaknesses in the health system itself. Housing conditions, captured through the number of rooms in a household, were also significantly associated with TB awareness. Overcrowded households with poor ventilation are known to promote airborne transmission of Mycobacterium tuberculosis.[207] The higher burden of pulmonary TB among respondents living in such settings underscores the role of environmental determinants in disease transmission and highlights the need to integrate social determinants into TB prevention strategies. The study also found that access to PHC services was generally poor, reflecting longstanding structural challenges in rural Nigerian health systems. Infrastructural deficiencies, high user costs, and mistrust of health service quality contribute to the sustained underutilization of PHC services.[201,202] These factors collectively perpetuate health disparities in rural communities, where PHC is intended to serve as the cornerstone of the healthcare delivery system.[203,204] Additional contributors to poor PHC access may include misconceptions about PHC, ineffective leadership, and health system fragmentation, which impede efforts to achieve universal health coverage in rural settings. Contrary to expectations, no significant association was found between TB awareness and access to PHC services. This result mirrors findings by Kirenga,[202] who reported that even where TB

knowledge is adequate, systemic and socioeconomic barriers may continue to hamper access to health services.[206] This contrasts with earlier studies suggesting that improved TB awareness should enhance healthcare utilization, indicating that the determinants of health-seeking behaviour in resource-constrained contexts are complex and extend beyond individual knowledge. Overall, the findings highlight the dual challenge of poor TB awareness and limited PHC access in rural Orlu.[201] Addressing these challenges requires targeted interventions that prioritize socio-economic empowerment, enhanced health literacy, improved community engagement, and substantial infrastructural investment. Strengthening PHC systems, while simultaneously educating communities, is essential to reducing TB-related morbidity and mortality and improving overall health outcomes among women in rural Nigerian communities. This study is limited by its reliance on self-reported and interviewer-administered questionnaires, which may have introduced reporting and interviewer bias. The use of non-probability sampling, driven by security and accessibility constraints, also limits the generalizability of the findings to all rural communities in Orlu. Additionally, the cross-sectional design restricts the ability to infer causal relationships between TB awareness, PHC access, and health-seeking behavior. Despite these limitations, the study provides valuable insight into the factors shaping TB awareness and primary healthcare access in the region.

CONCLUSION AND RECOMMENDATION

This study shows that women in rural communities in Orlu have persistently low awareness and knowledge of pulmonary tuberculosis (TB), despite reporting generally good health. Although education and living conditions, especially household overcrowding, were significant factors influencing TB awareness, improved knowledge did not translate into better access to primary health care (PHC) services. This gap reflects deeper structural challenges, including insecurity, inadequate PHC infrastructure, limited staffing, and negative perceptions of healthcare quality. These systemic barriers continue to hinder effective healthcare utilization and contribute to the ongoing TB burden in the area. To address these issues, interventions must focus on strengthening PHC facilities, improving security, and enhancing governance within the health system. Increasing community engagement, particularly through empowering women and improving health literacy, is crucial for promoting timely care-seeking behaviour. Health workers must adopt more patient-centred approaches and intensify TB education at the community level. Ultimately, coordinated efforts involving government, health providers, and community stakeholders are necessary to reduce TB burden and ensure equitable access to quality healthcare services in rural Orlu.

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